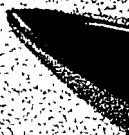




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CONTRIBUTIONS

TO THE

NATURAL HISTORY

OF THE

HUDSON'S BAY COMPANY'S TERRITORIES.

PART I.—REIN-DEER.

BY

ANDREW MURRAY, EDINBURGH

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*Contributions to the Natural History of the Hudson's Bay Company's Territories. Part I.—Rein-Deer.* By ANDREW MURRAY, Edinburgh.\*

Perhaps I may be allowed, before proceeding to the proper subject of this paper, to say a few words in explanation of the somewhat ambitious title I have given to it, and of how I come to be in a position which entitles me, with a reasonable prospect of keeping the promise thereby implied, to offer the *first* part of "Contributions to the Natural History of Northern America."

In the Hudson's Bay Company's charter, which was granted by Charles II. in the year 1670, the preamble, or narrative of the cause why it was granted, bears that certain individuals had, "at their own great cost and charges, undertaken an expedition for Hudson's Bay, in the north-west part of America, for the discovery of a new passage into the South Sea, and for finding some trade for furs, minerals, and other considerable commodities, and by such their undertaking, have already made such discoveries as do encourage them to proceed further in pursuance of the said design, by means whereof there may probably arise very great advantage to us and our kingdom;" therefore his Majesty had resolved to grant them the tracts of land therein specified, and the sole trade and commerce thereof.

This, it will be seen, was no condition that the Company should do anything for science, or future expeditions, or discoveries. Whatever was the motive which led to the charter being granted, the grant itself was unfettered by any restriction or condition relating to such matters.

The Company, however, has always acted as if the motive

\* Communicated to the Royal Physical Society of Edinburgh, Nov. 26, 1857.

which may have led to the grant, viz., the merit of past and the hope of future discoveries had imposed an express obligation on them to do everything in their power to foster researches in the dominions so conferred on them.

The extent to which the assistance of the Company has thus been given to science cannot be estimated; but it is not too much to say, that no public or private expedition was ever conducted through their territories which did not draw largely upon the liberality and assistance of the Company. Their own numerous explorations, their extensive geographical surveys, and the able and ready help which they have given to the search after Franklin and his crew, are instances which it is scarcely necessary to recal to the mind of the reader. I have, however, had special opportunity of seeing the liberal mode in which they extend their assistance to scientific objects, on the occasion of a botanical expedition being sent out a few years ago by an association formed in this city, to procure seeds of new and valuable hardy trees and plants from Oregon and the neighbouring districts. I acted as secretary to that association, and conducted the negotiations with the Hudson's Bay Company for securing their assistance to the collector (Mr Jeffrey). The liberal spirit in which I then found that the Company looked at things impressed me no less than the extent of the power they possessed. But there were other things which struck me with equal force. In studying the route followed by Jeffrey, I had the enormous extent of their territory forced strongly upon my attention—thousands of thousands of miles still inhabited only by the "wild;" and all this territory dotted over by the trading or hunting stations of the Company. I found also, in the occasional correspondence I had with the officers stationed at some of these remote posts, that they were obliging and intelligent. I imagined that many of them (from their hunting propensities, which may have led them to the life they followed) must have an instinctive taste for natural history; and when I put all this together, I felt that here was a great opportunity for enlarging our knowledge of the natural history of a considerable portion of the globe, which was lying fallow only because no one advanced his hand to seize it.



Seeing that no one else did so, I resolved to try what I could do myself, and I applied to the Governor and directors of the Hudson's Bay Company for permission to circulate throughout the posts scattered over their territory a paper which I prepared, entitled, "Instructions for Collecting Objects of Natural History;" in which, in few words, I gave general directions for collecting, preserving, and sending them home; and concluded by requesting those officers of the Hudson's Bay Company who might have a taste that way, to aid me by collecting for me, and transmitting to me the proceeds of their exertions.

Through the kind assistance of Mr Edward Ellice jun., my application was favourably received; and the Governor and directors not only sanctioned the distribution of my circulars, but charged themselves with it, and undertook to forward to me any collections that might be made,—the only condition imposed being, that the officers of the Company should not allow such collecting to interfere with the proper duties of their stations.

Five hundred copies of my instructions were accordingly sent out last year, and scattered over the length and breadth of the land; and the first-fruits of the seed so sown is the arrival, a few weeks ago, of six cases containing different objects of natural history, a portion of which will furnish the text for this paper.

I begin with the largest objects, viz., four magnificent heads and antlers of rein-deer, which have suggested some remarks on the disputed point of the identity of the European species with that of America, and on one or two other points of incidental interest.

The specimens received were sent by Mr Hargrave of York Factory. In his letter announcing their despatch, he says,—"Since writing the above, I have received from our trading station at Church-hill some specimens of "*Esquimaux*" rein-deer horns, obtained from the natives who visit that post from the south shores of Chesterfield Inlet,—two pairs of the handsomest of which, and two more from their very peculiar shape, I have caused to be bound into two bundles, under your address, and will ship them to London

next month." It thus appears that the locality from which they come is that known as the Barren Ground; which is that sterile district forming the northernmost part of Canada, and bordering the shores of the Icy Sea, and that they belong to the variety described by Sir John Richardson under the name of "*Cervus Tarandus*, var. *a. arctica* (Barren Ground caribou)." Whether that variety is or is not a distinct species is a question still open among naturalists. The weight of opinion certainly is in favour of its being merely a variety, and not a species. Sir John Richardson himself treats it as a variety; but at the same time he says (*Fauna Boréli-Americana*, vol. i.), "The rein-deer or caribou of North America are much less perfectly known (than the European). They have, indeed, so great a general resemblance in appearance and manners to the Lapland deer that they have always been considered to be the same species, without the fact having ever been completely established;" and again, in speaking of the two North American varieties which he describes,—viz., the Barren Ground caribou, and the Woodland caribou, he says, "Neither variety has as yet been properly compared with the European or Asiatic races of rein-deer, and the distinguishing characters, if any, are still unknown." Colonel Hamilton Smith, in Griffith's edition of Cuvier's *Animal Kingdom*, had previously spoken much in the same doubtful way, but still had not ventured to erect the varieties into species. He said, "The North American rein-deer or caribou are still very imperfectly known. There appear to be three varieties, one or more of which may actually form different species." The most recent evidence on the point, however, is that of Dr Gray, who, in his *Catalogue of the Specimens of Mammalia in the British Museum (Ungulata fuscipeda)*, 1852, has included the North American rein-deer, along with the Lapland rein-deer, under the old name of *Tarandus rangifer*, noticing them only as varieties. It does not matter whether we take this as an evidence of the views of naturalists in general at that date, or merely as the expression of the opinion of Dr Gray himself. No one ought to oppose the general opinion of concurrent naturalists, or the individual opinion of such a man as Dr Gray (admittedly one

of our first living mammalogists), without at least distrusting his own judgment, and carefully weighing the arguments for and against the opinion which they have sanctioned by their authority; and it is only after having done so, to the best of my ability, that I have come to a different conclusion.

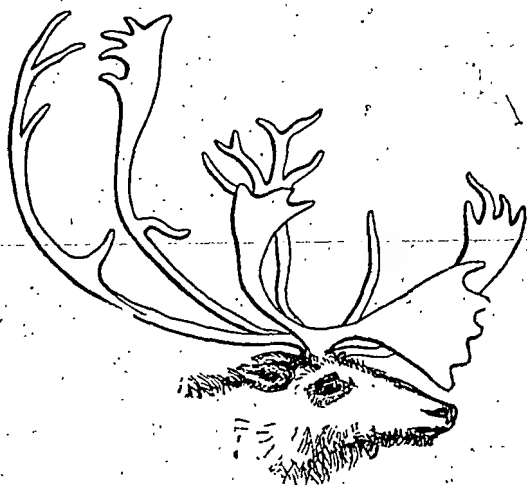
The grounds on which these naturalists retain the American as part of the European species are wholly negative. They do not find any differences sufficient to constitute specific characters. Let us, therefore, see what the differences in the characters of the two varieties really are, and examine their extent and value.

In the first place, the form of the horns is different. Sir John Richardson, indeed, by way of qualifying the value of this character, says, "It is to be recollected, however, that the antlers of the rein-deer assume an almost infinite number of forms, no two individuals having them alike." True; and the same may be said of the characters of all variable species; but in them, as in the rein-deer, there is a character of form which, constantly varying in individual detail, is constantly permanent in the general effect. The Lapland deer have one character, the North-American another. Sir John Richardson gives figures of two heads of Barren Ground rein-deer, and although the minute details somewhat vary from those I received, the general effect is so much the same, that the figures of the one and the other might be taken for the first two heads sent to me by Mr Hargrave, one of which is figured below (fig. 1).

The most characteristic points in the American species are the triangular-bladed brow antler, the longer and more slender stem, and the fewer processes; but the first of these (the brow antler) is that on which I would chiefly rest, for it is a structure prepared and adapted to a condition of life, and therefore of more value as a specific character than any peculiarity not so adapted. In it the antler descends almost parallel to and close above the front, reaching down as far as the muzzle, there turning upwards in an abrupt, nearly straight line; the whole antler forming an elongated triangle, of which the apex is next the root of the horn. In the Lapland species the brow antler projects more directly out from the forehead, not being parallel to the front, but at a somewhat

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acute angle from it, and it is not formed in the triangular

Fig. 1. (North American Species.)



shape of the other, but, although palmated, has the ends curved up, as in the upper prongs or antlers (see fig. 2). Now, as

Fig. 2. (Lapland Species.)



already said, this character has more significance than the mere difference in form implies. We know that the deer with palmated horns are confined to the colder regions of the earth, and when the palmation is much developed it is probable that its purpose is to scrape and shovel away the snow from their food. But we see that all the deer with palmated horns are not equally provided with these shovels. Some are better and some worse; but none of them bears any comparison with the apparatus of the North American Barren Ground caribou. It has, in addition to the basal palmated triangular shovel, a second projecting prong with terminal points or fingers curved inwards, very like the brow antler of the Lapland deer. The use of these pieces of apparatus is sufficiently obvious. The upper projecting antler with curved points is to scrape into and break the surface of the hard crust of frozen snow; the triangular ploughshare or spade is to shovel away the softer snow below; and its structure is so admirably adapted for this purpose, that it is impossible to doubt the evidence of design exhibited in it. In the more perfect specimens the two projecting basal prongs fill up the whole space above the head, and the termination of the right prong is slightly curved towards the right, like a shovel, or an open hand looking in that direction, and the other is slightly curved in the opposite direction; so that, actually, we have a double-acted shovel, no motion being lost—the reverse motion to the left, which was necessary to enable it to give the impetus of a fresh sweep to the right, clearing away in its course a shovelful to the left, and the returning motion to the right to give impetus to the motion to the left, shovelling away in its course a portion to the right. The less furnished specimens have only one single basal antler, but its straight upright position renders it nearly equally available for this double-acted power.

The habits of this species also are known to correspond with this structure. Every author who treats of the North American species speaks of its using its horns to clear away the snow; and whether this was recorded or not, the well-used and much-worn state of the palmated divisions in the specimens now received proves sufficiently that this is their habit, and, by inference, that this is the purpose for which the peculiar form

which these horns possess has been bestowed upon them. That the Lapland deer also use their horns, more or less, in removing the snow from the food which it covers, may be true; but that their horns are much less used for this purpose appears, not only from the form of the horns; but also from the notices of their habits, which we find in the works of those authors who have treated of them. In some of these a trivial notice occurs of their using their horns as well as their feet (which are their principal implements), but in most of them the feet are mentioned alone as used for this purpose, and no notice taken of the horns; so much so, that Colonel Smith says, in continuation of the passage already quoted,—“With them (the horns) they (the North American species) are also said to remove the snow, but it does not appear that this process has been noticed in Lapland.” This flat triangular blade, therefore, which is the proper and full-grown form of horn in the adult animal, and thus the normal and specific form, I consider to be one of the principal characters of the North American species.

It may, however, be said that this habit, and corresponding apparatus, in the American rein-deer, are mere variations induced by climate, and not specific distinctions. But it humbly appears to me that this character cannot be so treated. That a species inhabiting a colder, and more barren district should degenerate in size may be admitted; and we should not, on account of its smaller size, think of making it anything more than a climatal variety; but that an animal should be provided with a different or a more developed apparatus in order to accommodate it to a different condition of life, seems to imply much more than such a variety. If the North American Barren Ground animal is provided with this triangular spade or shovel because the snow is deeper in America than in Lapland, and a more efficient implement is necessary to enable it to get at its food, I look upon this as being in itself proof of the distinctness of the species. If, on the other hand, the snow is not deeper in America than in Lapland, then the difference in the apparatus makes still more against the climatal theory; for here we would have a different form for the same conditions of life.

There are other differences besides those of the horns. The

colour of the North American species is lighter, both in its summer and its winter garb—being yellowish-brown or fawn-coloured, instead of dark-brown, in summer, and white, instead of grey, in winter—matters which *per se* are not of much consequence, but which, taken along with other differences, are of some weight.

Another most important point is, that the North American species has never been domesticated; but this involves a question much too long and too important to be fully discussed in the present communication. My own view of it is, that those social animals which are capable of being thoroughly domesticated are invariably found domesticated, and that the fact of an animal not being domesticated is proof that it is not domesticable. It may be said that it is the fault of the Esquimaux that the North American species are not domesticated, that they are a less intelligent race than the Laplanders, or that they have less aptitude for domesticating animals. But this is not the case. They have domesticated their Esquimaux dogs; and that they have tried to domesticate the rein-deer, and failed, is, I think, to be inferred from the following remark of Hearne:—"The moose is the easiest to tame and domesticate of any of the deer kind;" implying that the attempt had been made upon them all; and as we know from other sources, that the moose and other deer have been tamed, but never domesticated, the inference from this remark of Hearne's is, that if the North American species had been domesticable, they would have been domesticated by them. Mr. Hutchins, indeed, speaking of the woodland caribou, says that several of the fawns had been brought up at the factories, and had become as tame as pet lambs; so have antelopes and deer of all kinds. But we must bear in mind that taming and domestication are two widely different things—a lion can be tamed, but not domesticated. Our common bull is domesticated, but often not tamed. The taming of a wild animal must thus not be confounded with the domestication of a social animal, and does not bear upon the point in question. Indeed, I firmly believe that this is not a matter which is left by nature to chance. How it is managed I do not pretend to say—possibly by an

imperious instinctive desire impressed on the animal, craving that it should be domesticated, and compelling it to make the first advances; but whatever be the mode, I entertain no doubt that the securing the object has been carefully attended to by nature from the first; and where an animal is domesticable, there is as little chance of its being found undomesticated as there is of an undomesticable animal being found domesticated. The adoption of this (its domestication) as a specific character, would relieve our comparative anatomists and systematists from the inconsistencies and difficulties in which they have become involved in their attempts to determine the wild stocks from which our domesticated breeds have originally sprung. All inquiries on this subject have hitherto proceeded on the foregone conclusion that the domestic breeds must be referable to one or other of the wild species. Let this view be abandoned, and let it be conceded that it is at least possible that domesticable species have been created for the special use of man, and let the species, then, be compared with one another with as great a willingness to find them distinct as there hitherto has been a determination to find them the same, and I am sure that (in some of them at least) as good specific characters will be found for distinction as are thought sufficient in other species; and it must be kept in mind, that we are left, in considering the subject, almost entirely, if not wholly, to the *characters* of the animals themselves; for no instance occurs in which the actual period or process of domestication of any species has taken place under the eyes of man, or even has occurred within the period of authentic history. Neither can we point to any undisputed instance of a species having been once domesticated, and having afterwards relapsed into wildness. The African elephant, which we know from history was used, both in peace and war, by the Carthaginians and other North African nations in the time of the Romans, may be cited as an instance contradictory of this; but, in the first place, we do not know that the species possessed by the Carthaginians was the same species as that now found to the north of the equator in Africa, nor even that the species so found now is the same as the South African species. The effigies of some of the elephants represented on an-



cient Roman medals are no doubt figured with the large ears of the present South African species; but there may have been, and may still be, more than one species with large ears; and, in the second place, it is possible that there may be some species (among which the African elephant should possibly fall) which are only half domesticable,—such, perhaps, as our common duck (which has always a disposition to wander), the alpaco, &c., and which may not fall properly under the definition of domesticable animals, but rather form the link between those which are wholly so, and those which are not so at all. At the same time, I confess I prefer the undiluted theory, and hope at some future period to submit to the reader a more detailed explanation of my views and arguments on the subject.

Before leaving the horns, there is a statement made with regard to them by most authors which appears to me to call for revision, and regarding which I shall hope to get some of my new Hudson's Bay friends to make fresh observations. The statement is, that the male sheds his horns in November. Now, it appears to me so opposed to all the usual proceedings of nature that she should provide this admirable apparatus for clearing away the snow, only to throw it off at the very period when it would come into use, that I cannot bring myself to believe that there is not some error in the statement. I have therefore examined as many authorities as I could, in order to trace from whence this statement originated; for we often find in Natural History, that a statement originated by some one individual is repeated by subsequent writers without inquiry or consideration. The oldest statement on the subject which I find is that of Pennant in his "Arctic Zoology,"\* where he says, "They go to rut in September, and the males *soon after* shed their horns." Hearné, who had ample opportunity of judging from personal observation, makes the following remarks in his journey to the Northern Ocean, 1795:†—"The month of October is the rutting season with the deer in these parts, and after the time of the courtship is over, the bucks separate from the does: the former proceed to the westward to take shelter in the woods during the winter, and the latter keep out

\* Vol. i. p. 26.

† P. 197.

in the barren ground the whole year. This, though a general rule, is not without some exceptions, for I have frequently seen many does in the woods, though they bore no proportion to the number of bucks. This rule, therefore, only stands good respecting the deer to the north of Churchhill River; for the deer to the southward live promiscuously among the woods, as well as in the plains, and along the banks of rivers, lakes, &c., the whole year. The old buck-horns are very large, with many branches, and always drop off in the month of November, which is about the time they begin to approach the woods. This is undoubtedly wisely ordered by Providence, the better to enable them to escape from their enemies through the woods, otherwise they would become an easy prey to wolves and other beasts, and be liable to get entangled among the trees, even in ranging about in search of food. The same opinion may probably be admitted of the southern deer, which always reside among the woods, but the northern deer, though by far the smallest in this country, have much the largest horns, and the branches are so long, and at the same time spread so wide, as to make them more liable to be entangled among the underwoods than any other species of deer that I have noticed. The young bucks in those parts do not shed their horns so soon as the old ones. I have frequently seen them killed at or near Christmas, and could discover no appearance of their horns being loose. The does do not shed their horns till the summer, so that when the buck's horns are ready to drop off, the horns of the does are all hairy, and scarcely come to their full growth." This certainly is the testimony of a man apparently conscientious and desirous to tell the truth, with no object to do otherwise, and, moreover, with ample opportunity of getting at the truth, and with his attention specially directed to the subject, all which of course make the matter only more embarrassing. Next comes Colonel Smith: "*The males drop their horns after the rutting season in November, but the females, if gravid, keep theirs till May; under other circumstances, they drop theirs at the same time with the males; the new ones are eight months growing, not being complete till August.*" The anomaly to which I am alluding appears, however, to have struck him as well as Hearn, for he offers the

following explanation of the rein-deer shedding its horns so early as November:—"The horns of the rein-deer, indeed, drop in winter, but this takes place only at a period when the snow is already not only very deep, but frozen hard, and even then we see that the females, when gravid, and therefore in want of a greater supply of food, preserve theirs till May."\* Of the two, I must say I prefer Hearne's reason for the horns dropping in November. The harder frozen the snow, the more need of good implements to get at their food, which is under it; and if it is necessary for the females getting their food that they should retain their horns through the winter, the additional claim arising from their bearing an embryo or a fœtus scarcely seems sufficient to account for their having the means of securing it, while the males have not. Another, and not the least formidable testimony, is that of Sir John Richardson.† He says—"This (the velvety covering of the horns peeling off) takes place in September, previous to the commencement of the rutting season, and by the end of November most of the old bucks have shed their horns. The young males retain theirs much longer, and the females do not lose their horns until they are about to drop their young, in the month of May." Now, Sir John had a good opportunity of ascertaining how the fact stood; but I do not wholly read the paragraph I have quoted as a statement depending upon his own personal observation, for he goes on—"Hearne observes that the Barren Ground caribou bears horns twice the size of those of the woodland variety, notwithstanding that the latter was a much larger animal;"—thus showing that at the very time he wrote the paragraph he had been consulting Hearne, and it is just possible that it is his (Hearne's) observation that he is repeating, instead of giving the results of his own. His statement of the movements of the rein-deer is more important, and it corresponds more with Hearne's view of the reason why the horns are shed in November. He says‡—"The Barren Ground caribou, which resort to the coast of the Arctic Sea in summer, retire in winter to the

\* Griffith's Cuvier's Animal Kingdom, vol. iv., p. 70.

† Fauna Bor. Am. i., p. 241.

‡ Loc. cit., p. 242.

woods lying between the sixty-third and sixty-sixth degree of latitude, where they feed on the *Usneæ*, *Alectoriæ*, and other lichens which hang from the trees, and on the long grass of the swamps. - About the end of April, when the partial melting of the snow has softened the *Cetrariæ*, *Corniculariæ*, and *Cenomyces*, which clothe the Barren Grounds like a carpet, they make short excursions from the woods, but return to them when the weather is frosty. In May the females proceed to the sea-coast, and towards the end of June the males are in full march in the same direction. At that period the power of the sun has dried up the lichens on the Barren Grounds, and the caribou frequent the moist pastures which cover the bottoms of the narrow valleys on the coasts and islands of the Arctic Sea, where they graze on the sprouting carices and on the withered grass or hay of the preceding year, which is at that period still standing and retaining part of its sap. Their spring journey is performed partly on the snow, and partly, after the snow has disappeared, on the ice covering the rivers and lakes, which have in general a northerly direction. Soon after their arrival on the coast the females drop their young; they commence their return to the south in September, and reach the vicinity of the woods towards the end of October, where they are joined by the males. This journey takes place after the snow has fallen, and they scrape it away with their feet to procure the lichens, which are then tender and pulpy, being preserved moist and unfrozen by the heat still remaining in the earth." "The lichens on which the caribou principally feed whilst on the Barren Grounds, are the *Cornicularia tristis*, *divergens*, and *ochroleuca*, the *Cetraria nivalis*, *cucullata*, and *islandica*, and the *Cenomyce rangiferina*,"\*—all low ground-growing species. The statements, however, of the latest observer on the subject, Dr Armstrong†, are somewhat different, both as regards the shedding of the horns and the migration of the deer. As to the first, he says, "The calving season, as far as my observation enables me to judge, is in June, prior to, and coeval with which the bucks shed their antlers, which appear to be again entirely

\* Loc. cit., p. 243.

† Personal Narrative of the Discovery of the North-west Passage, 1857.

reproduced in the latter end of August and early in September;" and elsewhere he especially notices the rapidity of growth of the new horns. As regards the second part, he makes the following remarks; and observations to the same effect occur in "Osborn's Voyage of the Investigator:"—"It has hitherto been the generally received opinion that these animals migrate to the southward, on the approach of winter, to lands where the cold is less intense and the pasturage more abundant, an opinion formed from the writings of distinguished Polar voyagers who formerly wintered amid the icy solitudes of the North; but the experience of four winters enables me to speak from the result of observations in contradistinction to this. In the Prince of Wales' Strait rein-deer were seen in January—our distant position from the shore not enabling us to hunt during the winter; and in the Bay of Mercy, for two successive winters, they were constant inhabitants of the land, and were killed throughout the winter months of the coldest season in the records of arctic voyaging. How far the migratory habits of the animal may be established in a more southern latitude on the coast of America, in their instinctive resort to localities where pasturage may be more abundant, I shall not attempt to decide; but this I will say, that from the more distant lands of the Polar Sea they do not migrate on the approach of winter, but remain there constant inhabitants. I have remarked, however, that as the season of thaw sets in (May and June), coeval with the calving of the does, these generally resort to the ravines and valleys bordering the coast, where the pasturage is so much more abundant."\*

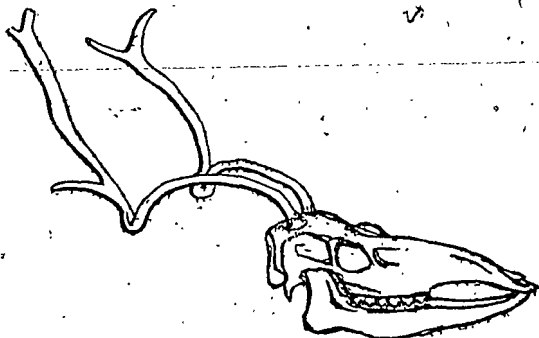
These narratives of the habits and food of the animal at different periods, and in different regions, are sufficiently discordant to induce us to pause before coming to an opinion upon them. They show the necessity of further observations, and indicate the points to which attention should be directed. Their tendency, on the whole, however, is in favour of what appears to me the necessary inference to be drawn from the horns. To the statements of the foregoing authors, where opposed to this view, I reply by pointing to the horns themselves. Not only is the ploughshare there, but it is evident

\* Loc. cit., p. 276.

it has been much and hard used; the edges are all rubbed off, and the inequalities smoothed down; and it is plain that this cannot have been done by removing snow in the summer-time, when it is all melted. From the specimens I have received I draw the following inferences:—*1st*, That they are the heads of old bucks: the size of the horns and worn teeth prove this; *2d*, That the triangular palmated plates on their horns are formed and used for the purpose of shovelling away the snow to get at their food; *3d*, That they have been used for this. *4th*, That they have been so used for a longer period than the month or six weeks after snow has fallen (in September and October) which Sir John Richardson gives them for returning over the Barren Grounds, where the lichens grow which they disinter for their food; *5th*, That it is in the winter they have been so rubbed and worn; and not in the summer; and, *lastly*, It should follow from these premises that the horns are not shed in November. Another argument against their being shed then may be drawn from what takes place with other deer. The red deer, for instance, in this country has its rutting season in September (the same time as the rein-deer), and the horns are not shed till April or May—the oldest, however, shedding them first. It is to be kept in mind that the rutting season and the growth of the horns are intimately connected together, the reproducing power under which the new horns advance in growth being then exerted to the utmost. The other North American deer, like the red deer and other stags, do not shed their horns before winter. The moose keeps them the whole winter; and the instance in question, if true, seems to be a solitary exception to the economy of all the rest of the deer tribe, so far as I have been able to ascertain. Still, the statements on the subject are too explicit, and from too high authority, to be evaded by an argument or an inference; although I must say that it is long since I have been of opinion that circumstantial evidence is of ten times more value than the best direct testimony in the world. All that I mean, therefore, by making these remarks, is to invite the attention of those who may have the opportunity of observing the animals to a more careful examination of the economy of the old bucks in respect to the shedding of their horns.

The two smaller heads sent me by Mr Hargrave as exceptional, from the form of their horns, are interesting. The one, from the state of its worn teeth, is obviously an old deer, although small in size, and with small horns. Its horns have, however, met with a distortion by which they have a curious bend in the middle, as shown in this figure. The

Fig. 3.



cause, whatever it may have been, has affected them both equally, which is not usually the case where horns are distorted—it generally happening that if one horn is injured so that it takes reduced dimensions, the nourishment which was meant for it is diverted to the other horn; and we have the two horns characterized, one by defect, and the other by excess. It is not easy to say what may have been the cause of this curious distortion. It may be that the poor animal, when its horns were still soft and young, got entangled among brushwood; and that here is the silent evidence of long struggles on the part of the animal, and of perhaps days of famine, before it succeeded in freeing itself from the bonds which held it. Or it may merely be a distortion consequent upon the old age of the animal, for we often find the horns in old deer stunted and distorted, although it is not usual to find them so symmetrically disfigured. It will be observed that this head wants the triangular ploughshare in front, but as it is obviously an abnormal and exceptional head, this want goes for nothing in the question of species. One of the other heads sent by Mr Hargrave is a young one, as shown by the teeth, and has not yet got the fan-shaped ploughshare, which, like

other antlers, only appears after the animal has acquired a certain age. It is unnecessary, moreover, to say, that in the observations I have previously made as to the form of the horns in the different species, I have spoken of characteristic examples of the full-grown animal, not of young or exceptional horns.

The dentition in the young deer is deserving of notice. The incisors overlap one another in a curious manner, except the outermost, which fits into a groove on the edge of the penultimate tooth. In the older heads the teeth stand apart. They are all very small; and the mode in which they are worn away in the older animals is peculiar. Instead of being worn flat on the crown, or somewhat inwards, as is the case with other ruminant animals, the front of the central teeth are worn down obliquely outwards. This arises most certainly, not from nipping *Usneas* hanging from the trees, or from cropping grass like a sheep, but from grubbing up the *Cenomyces* and other lichens growing flat on the surface of the ground—an additional argument in favour of these being their principal food.

Another interesting structure in these animals remains to be noticed; I mean the fur or hair. Of this Sir John Richardson says—"In the month of July the caribou sheds its winter covering, and acquires a short smooth coat of hair of a colour composed of clove brown, mingled with deep reddish and yellowish browns; the under surface of the neck, the belly, and the inner sides of the extremities remaining white in all seasons. The hair at first is fine and flexible, but as it lengthens it increases gradually in diameter at its roots, becoming at the same time white, soft, and compressible, and brittle, like the hair of the moose deer. In the course of the winter the thickness of the hairs at their roots becomes so great that they are exceedingly close, and no longer lie down smoothly, but stand erect; and they are then so soft below that the flexible coloured points are easily rubbed off, and the fur appears white, especially on the flanks. The closeness of the hair of the caribou, and the lightness of its skin when properly dressed, renders it the most appropriate article for winter clothing in the high latitudes. The skins of the young deer make the best dresses, and they should be



killed for that purpose in the months of August or September, as after the latter date the hair becomes too long and brittle. The prime parts of eight or ten skins make a complete suit of clothing for a grown person, which is so impervious to the cold, that with the addition of a blanket of the same material, any one so clothed may bivouac on the snow with safety, and even with comfort, in the most intense cold of an arctic winter's night."\*

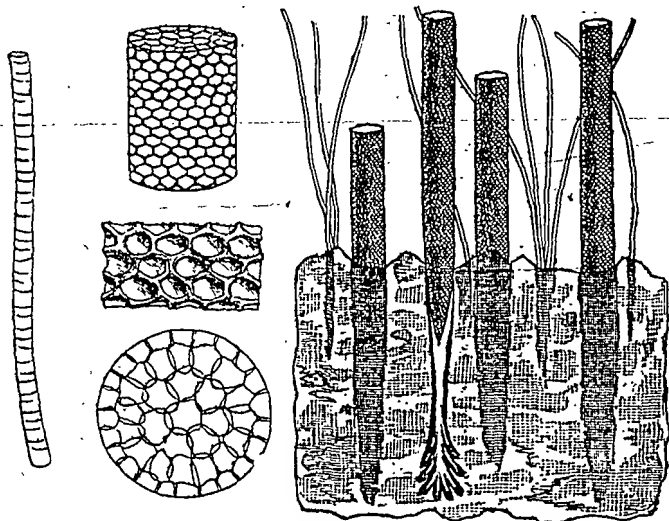
On a close examination of the skin, I have not found anything particularly different from the skin of any other animal. The hair is more patent to examination, and is interesting, not only in relation to its own economy, but also in relation to the views held by histologists of the structure of hair in general, and by physiologists of its mode of growth and development. It has already been made known by Professor Busk, that the hair of the deer tribe is peculiar, being almost entirely cellular; and the hair has been described and figured by Dr Inman, in an able paper "On the Natural History and Microscopic Character of Hair," published in the "Proceedings of the Literary and Philosophical Society of Liverpool," No. 7 (1851 to 1853); but as my observation somewhat differs from his, and he has limited his figure to what appears to me an inaccurate representation of the larger hair in one aspect, and has not described the equally interesting finer and smaller hairs, I have thought it desirable to give a careful view of both, with magnified representations of different sections; and that there may be no exception taken to their accuracy, I have got the drawing made by Dr Greville, whose name is a sufficient guarantee for its fidelity. The subject figured is the skin and hairs of one of the above-mentioned North American rein-deer; but the structure seems to be the same in all deer—at least it is so in all which I have examined—in the moose in the red-deer, roe-deer, musk-deer, &c., but not in the antelopes.

The figure on the right hand represents a somewhat magnified portion of the skin, with both kinds of hair issuing from it; the left hand figure represents a more highly magnified small hair; the upper centre figure shows a highly magnified portion of the

\* Loc. cit., p. 242.

large hair; the lower centre figure a transverse section of this; and the middle centre a longitudinal section.

Fig. 4.



Dr Inman says:\* "In the deer the cells are so numerous as to occupy the whole of the body of the hair, and so irregular that no particular place of subdivision can be traced;" and his figure quite corresponds with this, the cells being there shown as amorphous; but it will be seen from the above figure that they are truly polygonal—for the most part hexagonal, and there are very distinct septa and lines of separation. In fact, as Dr Greville pointed out to me, one of the most striking points in this structure is its close resemblance to (I might almost say identity with) polygonal cellular tissue seen in the hairs and other parts of plants.

The difference between the long and thick hairs, and the fine small hairs, is interesting and suggestive. We have here types of the two great sections into which hair may be divided growing side by side; the one wholly cellular, the other apparently without cells at all, and wholly horny and cortical. I do not doubt that, by the use of proper agents, we would find

\* Loc. cit., p. 89.

that the latter has a central cellular medulla or pith, as in the human and other hairs of a similar appearance. Like them, and most other hairs of that texture also, these fine hairs are imbricated, as may be faintly seen in the woodcut.

It is held by physiologists that both these kinds of hair are modelled on the same plan, viz., that of a cellular interior, surrounded by a horny cortical exterior, and that the difference in texture arises from the difference in the extent of development of the internal cellular pith or of the external cortical covering. In the one extreme forming the soft hair of the deer; in the other, the hard bristle of the sow. This view recommends itself by its simplicity and the unity of the *modus operandi*; but although it may be correct, so far as it goes, it does not explain the whole of the phenomena. For example, it does not explain why the hairs, where the horny covering predominates, are imbricated while those which are cellular are not; and it is to be observed, that there is a want of transition between the two characters of hair which certainly is opposed to a common mode of development. If it were the same, we ought to find hairs exhibiting all the gradations of passage between the two extremes, which we do not. Furthermore, they appeared to be designed for different purposes. Speaking in a general way, the horny or bristly hair is characteristic either of carnivorous animals, who have a greater supply of caloric than vegetable feeders, or of graminivorous animals inhabiting warm climates; while the cellular hairs in question are confined to the deer tribe, most of whom inhabit cold climates. It has usually been said, that the fine hair found at the roots of the coarser hair in these animals is an additional provision of nature for the warmth of the animal. It rather appears to me that in the deer at least it is the larger cellular hairs which have been added for this purpose (no one can look at them, I think, without seeing how admirably they are adapted for this), and that the horny hairs, whose office may possibly be as much that of a regulator of temperature as of a heating apparatus, are the normal hairs of the animal reduced to the smallest dimensions. If these two kinds of hair have distinct functions, their mode of development may also possess distinctive characters. We see that their roots extend to very different depths in the skin, and although

we know that the hair is a mere appendage of the skin, produced by its involution or evolution, it may be that, by drawing more of its substance from one layer than from another, the differences in its appearance, which we have been considering, are produced. These are points on which the recent researches of Kölliker, Leydig, Queckett, Inman, and other microscopists have not touched. It is only a skilful histologist who can take them up with any chance of success; and as I have no pretensions to such a title, I am glad to have enlisted my friend Dr Turner (Demonstrator of Anatomy) in the examination of the subject, and he has undertaken to see if he can throw any further light upon it.

Another interesting provision with regard to the hair is, that in the rein-deer and the moose or elk (the only two arctic species or families) the part of the muzzle called the muffle, instead of being left bare and moist, as in other ruminants, is clothed with hair—this forming the generic character of the group. A moment's consideration of what the effect would be of plunging a bare and moist muzzle into frozen snow, in the search after lichens, will show how necessary a deviation this is from the normal structure of that part. At first sight one might expect, on like grounds, some analogous deviation from the normal condition of the stomach in arctic animals, but there is none such, and the reason probably is that that organ is not very sensitive, and any special protection to it against the coldness of the food is therefore unnecessary.

The skin appears to be a good deal cut up before winter by the gad-flies and *Cæstri*, and we have no account how the damage done by these creatures is repaired before the severity of the winter begins to be felt; doubtless, the sores quickly heal as soon as the originators of the mischief drop out, and the part will only be thicker on account of the healing process; so that it would be rather curious if the unattacked part of the skin turned out to be in reality the weakest. The hair, too, is cast and replaced at this time, so that the comfort of the animals is sufficiently provided for.

CONTRIBUTIONS

TO THE

NATURAL HISTORY

OF THE

HUDSON'S BAY COMPANY'S TERRITORIES.

PART II.—MAMMALIA—*Continued.*

AND

PART III.—BIRDS.

BY

ANDREW MURRAY,

PRESIDENT OF THE ROYAL PHYSICAL SOCIETY OF EDINBURGH; PRESIDENT OF THE BOTANICAL  
SOCIETY OF EDINBURGH; AND MEMBER OF COUNCIL OF THE ROYAL SOCIETY  
OF EDINBURGH.

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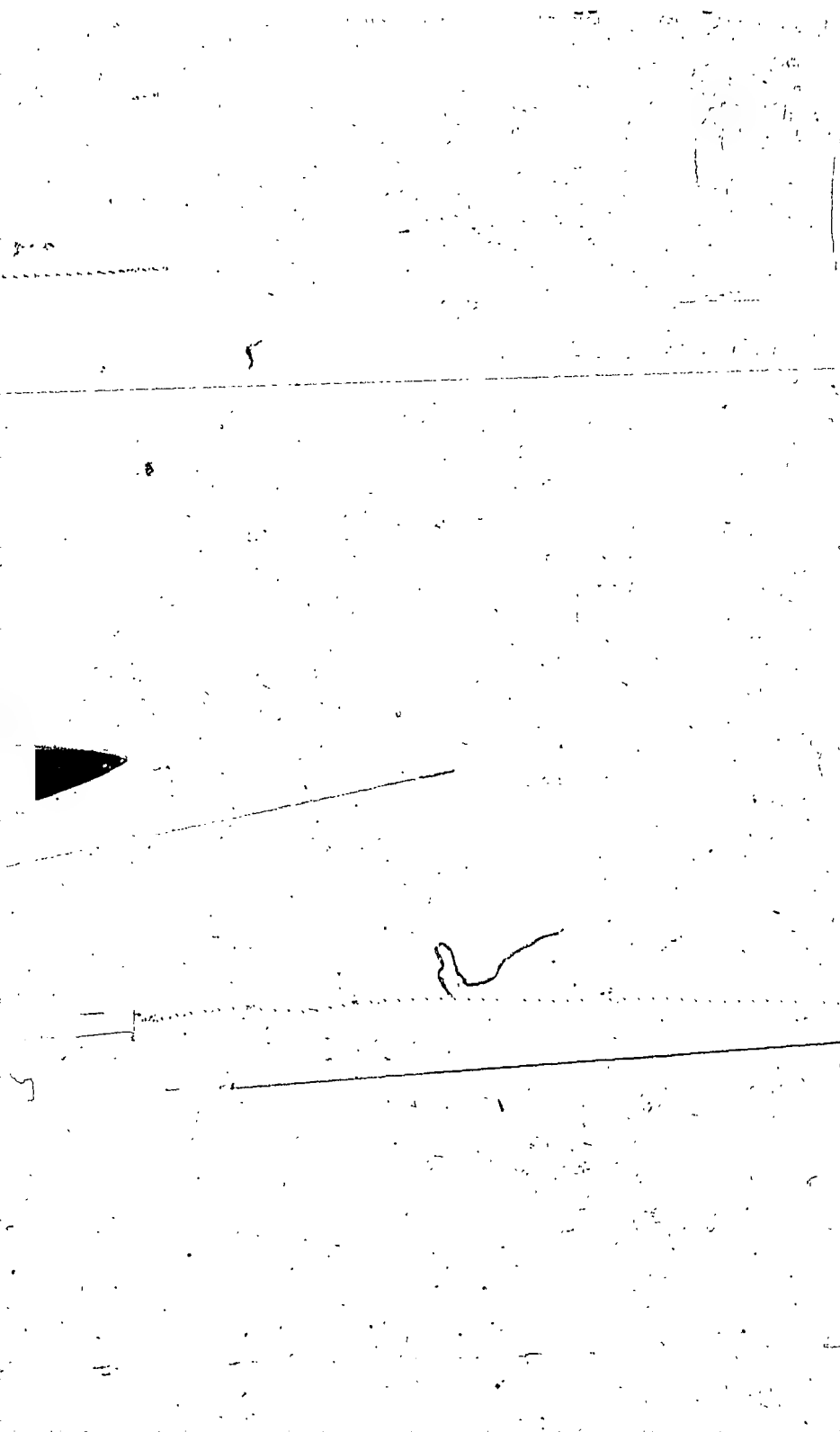
*From the Edinburgh New Philosophical Journal, New Series, for April 1859.*

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MDCCCLIX.



*Contributions to the Natural History of the Hudson's Bay Company's Territories. Part II.—Mammalia (continued.)*

By ANDREW MURRAY.

REIN-DEER (*Rangifer Caribou*).—In my last communication on this subject, I drew attention to the antlers of the American rein-deer,—their peculiar form, their mode of growth, and the habits of the animal,—as bearing on the question of its identity with the Lapland rein-deer, and made some suggestions and speculations, with the hope that they might lead some of my correspondents to inquire more particularly into these points, and give us reliable information upon them, which might enable us to come to a correct conclusion on the subject. I am happy to say, that these observations have had the desired effect, and that, with an additional supply of horns and heads, I have this year received divers remarks on the points I indicated for inquiry. One intelligent correspondent, Mr J. Mackenzie of Moose Factory (from whose communications I have received much satisfaction), goes at some length into the subject, and his information, as to the time of the year when the horns are cast at the different periods of the animal's life, clears up the discrepancies which have been noticed in the statements of different authors on this subject. It will be seen that the casting takes place at different times in the young and older animals. I cannot do better than bring his views before the reader in his own words, particularly as he comes to a different opinion from that which I felt disposed to adopt on one or two of the points which I speculated upon. Mr Mackenzie says—"I have consulted one of our most intelligent natives, a man of about sixty years of age, who has been a deer hunter from his youth, and the result of our "conference" I will presently give you. I send by the ship a deer's head and antlers, which were received about last Christmas, and said to have been killed early in December; it bears some resemblance to the North American species, a representation of which is given in your pamphlet, although the brow antler, however, forms a small angle with the head, and does not come down parallel with it, as in the heads sent you by Mr Hargrave; it has also

a second projecting prong, bent near the head, without any terminal points or fingers, but these it would have had, had the animal lived a year or two more; indeed the horns do not cease growing till the seventh year. I do not believe that the brow antler is intended for the purpose of clearing away the snow, but is intended rather as a means of defence against the animal's numerous enemies.—The wolf, wolverine, and lynx, destroy them, I am informed, in great numbers; but the animal, on its guard, appears to me to have a good means of defence in his brow antler. Generally, however, he is taken at a disadvantage; when lying down, and off his guard, the lynx (of the cat tribe) moves stealthily along, and with a bound springs upon his back, and fastening his claws in his neck and throat, worries him to death. The wolf and wolverine are not numerous (the latter, indeed, is rarely found) in this part of the country, but of the three the latter is the most savage, and with him the deer has little chance of escape when attacked. Indian opinion here is, that for clearing away the snow, the animal uses his fore-legs alone; and whether it is hard or soft, they are well adapted for the purpose. My own opinion is, that our rein-deer is the same as the Lapland rein-deer. The following information, collected as I have already mentioned, may tend to throw some light on the subject. The rutting season is in September; the females carry their young till the latter end of May or beginning of June, or till the *last snow* is disappearing. The horns begin to grow in about a month; at the end of the year they fall off, being about 8 inches long, and not branched; at the end of the second year they are about  $1\frac{1}{2}$  feet long, curved, and with terminal points, and are cast off in spring; the third year the front and brow antlers commence to grow, but are not large at the end of the year, and are cast off again in spring; the fourth year they are larger, but not full-grown, and are cast off in spring; the fifth year they are still growing, and are cast off in *March*; after the fifth year they are cast off in November. The Indian also states, that the antlers have a variety of shapes, and that it is rare to find two exactly alike. With regard to the training or domestication of the rein-deer I can say nothing from my own experience, nor from



that of any Indian at this place ; but I may mention, that I have recently seen a gentleman who passed many years near the head waters of the River Synauria (a river which falls into the St Lawrence, near the Town of Three Rivers, in Lower Canada), and that he had seen a young rein-deer among the Indians as tame as a lamb ; it entered the lodge, and followed its master like a dog ; but it was at last killed by the dogs."

Mr Mackenzie's observations will be of use in correcting misconceptions on one or two of the points alluded to by me. It would appear that the American species uses its feet in clearing away the snow from its food, as much as the Lapland species does ; and the cup-shaped structure of its feet, as shown in the specimens now sent home, is admirably adapted for this. That it does not use the projecting shovel-like brow antlers for the same purpose I am less willing to admit ; the apparent adaptation of their form to this purpose induces me to defer forming a definite opinion upon it until further information be obtained ; the rather that, however intelligent and truthful the Indian referred to by Mr Mackenzie may be, his statement is merely negative, and is inconsistent with the observations of such authors (few in number though they be) as notice the point.

As to the identity of the Lapland species with the North American, we cannot expect to arrive at any correct result, until we have the means of making a more complete comparative examination than has yet been done of the two species alongside of each other. Notwithstanding the greater distance of its locality, we possess both better materials and more accurate information on scientific points regarding the species from North America than that from Lapland. It is to the latter that our inquiries should now be directed, and more accurate information sought for on such points as the periods of growth and shedding of the horns, referred to in my previous communication, and in Mr Mackenzie's letter. His statements on this point have been confirmed to me by Mr Hargrave, who also informs me, that the head with distorted horns, sent last year, which was figured in the first part of this paper, was that of a young animal, not more than two years old. He mentions, that a slight bend is common in the first year ;

that this becomes of the distorted form above referred to in the second year, but afterwards disappears. I was misled, by the teeth being much worn, into the supposition that it was an old animal. These worn teeth must be the milk teeth; and we thus have incidental information as to the period the animal carries them.

Information on such points becomes of importance, because the North American and Lapland species are so closely allied to each other, that we cannot expect to find distinctions of a prominent nature, and must be content with the accumulation of those of a more subordinate character. I may notice, that I find the view which I adopted—viz., that the species are distinct—has also been entertained by Professor Spencer Baird of America, who, in his recent "General Report upon the Zoology of the several Pacific Railroad Routes, Part I.—Mammal," includes two species of rein-deer as inhabiting the northern shores of North America (the *Rangifer caribou* and *R. Grænlandicus*), and both distinct from the Lapland deer; at the same time admitting that their distinctness is questionable.

**MOOSE DEER** (*Cervus Alces*, Lin.).—Mr Hargrave has had the kindness to send me a magnificent head and horns of this fine elk, which is another animal as to whose identity with its European representative we are still in doubt. The Scandinavian elk is undoubtedly very near it, if not the same.

The enormous palmation and weight of the horns in this species is very striking. Colonel Smith says that the horns sometimes weigh fifty pounds. The present specimen weighs 32 lb., but that is inclusive of the head. Sir John Richardson, in his account of the animal, records a statement relating to the horns of deer which I think must have originated in some curious mistake. Speaking of the moose deer, he says,—"It is probable, however, that La Hontan in this passage confounds the Canada stag and moose deer together. He mentions the animal being able to run in the summer season for three days and nights in succession, and the excellent flavour of its flesh—facts which apply to the moose deer, but not to the Canada stag; on the other hand, the weight of the horns, which he says sometimes amounts to *four hundred weight*, is

true only of the stag." Now, the Canada stag, or *wapiti*, is the representative of the red deer in America, and was indeed long thought to be identical: it is a larger animal than our stag, but smaller than the moose, which is as high as a horse. Large specimens of the male moose are mentioned, which have attained a weight of eleven or twelve hundred pounds; and is it possible that a smaller animal should have horns weighing four hundred weight? I suspect a cypher has been added, and that we should read 40 lb. instead of 400, which would then make it clear that the animal referred to by La Hontan was the moose. With regard to the moose being able to run for three days and nights in succession, an instance of its doing so is recorded in the narrative of Captain Franklin's second journey, where three hunters pursued a moose deer for four successive days, until the footsteps of the deer were marked with blood, although they had not yet got a view of it. At this period of the pursuit, the principal hunter had the misfortune to sprain his ankle, and the two others were tired out; but one of them having rested for twelve hours, set out again, and succeeded in killing the animal, after a further pursuit of two days' continuance. The cause of the footsteps being marked with blood might be from the phalanges of the hoof splitting, or possibly from the hoof becoming worn down by incessant and long-continued action on the icy crust of the snow. We are accustomed to hear of the cattle in long journeys in the Cape of Good Hope and Australia becoming knocked up, and the traveller being arrested in his journey by the failure of his beasts of burden. I daresay many people entertain the idea (as I did myself) that this knocking up was the consequence of physical exhaustion on the part of the cattle. Mr Ford, one of the best zoological draftsmen in Britain, first enlightened me on this point. He had accompanied Dr, now, deservedly, Sir Andrew Smith in one or more of his exploratory expeditions to the interior of the Cape; and he told me that this failure of the cattle was occasioned, not by exhaustion, but by the actual wearing away of the hoof, till blood oozed from it at every pore. The Calahari desert was particularly obnoxious, as it is composed of a slaty formation, highly inclined, which shivered easily off into sharp fragments. It was like walking on bundles of pen-

knives, with their edges placed upwards. The cattle gave in sooner in this desert than in any other district, in consequence of the greater abrasion of the hoofs upon this slaty formation; and, till they grew again, the animal was useless, and scarcely, even to crop its food, would it stir from the spot where it was unyoked. I do not know what length of time would be necessary to incapacitate an ox,—of course, it must be various, according to the extent and nature of the ground travelled over; but although soft snow might protect it longest, I imagine the brittle fragments of a hard frozen crust of snow might be not much less destructive than the slaty splinters of Calahari.

I have examined the hair of the moose deer, and find that its structure is the same as that of the rein-deer, which I have already described in my paper last year.

ALPINE HARE (*Lepus glacialis*, Leach).—This beautiful hare furnishes an admirable example of the adaptation of structure to habit. For heat and comfort nothing can surpass its thick, delicate, white fur, which, on the under side of the paws, assumes such a compact, double-plyed, felt-like character, that one would think no degree of cold could penetrate it. The whiteness of its colour also is so pure that it is most difficult to discern it on the snow. Sir John Richardson notices that in one of the boat voyages in which he took part along with Franklin, they landed on a rocky islet off Cape Parry, which, although not above 300 yards in diameter, was tenanted by a solitary Alpine hare. The whole party went in pursuit of this poor animal; but it availed itself so skilfully of the shelter of the rocks, and retreated with so much cunning and activity from stone to stone, that none of them could obtain a shot at it, although it never was able to conceal itself from their search for more than a minute or two at a time.

Its flesh is said to be better eating than either the American or European hare.

QUEBEC MARMOT (*Arctomys empetra*, Schreb.).—This animal, although recorded as being found in the Hudson Bay Company's territories, would appear to be confined to their southern parts. I have received none from my northern cor-

respondents, but only from Canada, where it would appear not to be rare.

**MUSK RAT** (*Fiber zibethicus*, Cuv.)—This is a very common species in the Hudson Bay Company's territories, and supplies a large portion of the furs sent to this country. Its skin is used as medicine or medicine-bags by the natives, in which state the specimens sent to me have arrived.

**BEAVER** (*Castor Americanus*, Brandt).—Considering the immense number of animals both of this, and more especially of the preceding species, which have for a long series of years been taken for the purpose of supplying the wants of civilized Europe, we might have expected that specimens would be by no means rare in our museums. The contrary is the case, however, so much so that when my friend Dr J. A. Smith a year or two ago wished to compare the semi-fossil bones of a beaver found in a superficial deposit in Scotland with the recent skeleton of a beaver, the comparison could not be made in Scotland from want of a specimen of the recent animal in any of the museums in that country. I applied to Mr Mackenzie to assist us in remedying this deficiency, and he has very kindly done so by sending both a full-grown living beaver, and a foetus taken from the mother before birth. In sending a living specimen Mr Mackenzie remarked that it would probably ultimately answer the purpose of a skeleton, should the climate of Edinburgh not agree with the animal's constitution. I had destined it for the pond in the Edinburgh Royal Botanic Gardens, where Professor Balfour could have given those interested in natural history an opportunity of studying its habits at their leisure. It might easily have been kept alive if it once had reached the gardens. There would have been no difficulty in supplying it with birch twigs and branches, its native and proper food; and Mr Mackenzie informs me that it is by no means particular in its food, and that if it had the run of the kitchen (that is, I presume, the opportunity of selecting what it chose from the debris of an ordinary family's table) it would do very well. Unfortunately, it never got the chance of trying the climate of Edinburgh, nor we the chance of trying experi-

ments upon it or its food. It reached London alive, but that was all. It died next morning. It was, however, carefully transmitted to me, and along with the fetus received last year was presented by me to Professor Goodsir, who has undertaken to make a careful dissection of it, and to communicate anything he might think of interest. There are a number of points in the internal anatomy on which information is wanted, such as the castor, and the glands which produce it, and others which might throw light on some disputed (I cannot call them doubtful) points in its economy, and habits. For instance, we know from Hearne, that the usually received notion that the animal uses its tail as a trowel to plaster its work, is merely a vulgar prejudice, arising from its flapping it on the ground occasionally, and more particularly when about to plunge into the water. Now, an examination of the muscles of the tail might, were it necessary, throw light upon this point. But I imagine that the whole structure and habits of the animal explain the use of the tail sufficiently even without anatomical assistance. On examining its external peculiarities we find that its fore paws and feet are short and comparatively small and weak, and not provided with a web; the claws are strong, and well adapted for digging, but not equal to those of the hind feet. The hind feet and legs are enormously strong, the fingers united by a strong broad web, the claws excessively developed, and each in the form of a strong gouge. The combination of machinery in the fore and hind legs and feet thus corresponds with what we know of the habits of the animal so far as that can be observed; and the structure of that portion whose working is difficult to be observed in action, or has not been noticed sufficiently, shows what its real working is. Those who have observed the animal in its native haunts, tell us that it uses the fore paws for carrying the mud and stones used in its constructions, and that it carries this stuff between them and its breast, which quite corresponds with their attitude in my dead specimen. It no doubt uses the fore paws for other purposes, as digging, swimming, and walking (for nature seldom or never creates an organ merely to fulfil one purpose). As clearly, the hind paws are much used in digging, but most in swimming;—the powerful hind leg, enormous web foot, and strong claws, would prove this although no

one had ever seen the animal using them. Combine these different actions of the fore and hind feet together and see what would be the result. Suppose the animal swimming across its pond or river with a burden of heavy materials clasped to its breast by its fore paws, and powerfully propelled by its hind legs, and that it had no tail or only a common tail—what must inevitably be the consequence? The hind feet would propel the animal rapidly enough—no doubt about that—but where to?—why, to the bottom, for, being overloaded in front, it would be top heavy, and its head becoming directed obliquely downwards the more violent the exertions of the hind feet, the sooner it would reach the bottom, and the deeper its head would be buried in the mud. That this is the necessary and inevitable consequence of the want of the action of the fore paws, will be evident to every one if they will merely fancy what would be the result of their trying to swim with their arms folded; of course, if there is not only the inaction or abeyance of the fore arms to be conquered, but also the weight of a load of mud or stones to be counteracted, a counterpoising lever of more than ordinary power will be necessary, and this is supplied by the broad flat horizontal tail, which is constructed on the best principles for attaining such an object. Were it different or differently placed, the end would not be answered; suppose it vertical like a fish's tail, it would answer equally well as a swimming organ, but not as a counterpoise. It must be powerful, and it must be horizontal, so as to press broadly downwards, and as the purpose here is to increase resistance and friction, and not to diminish it, it is denuded of hair, or nearly so, and covered with polygonal scales. A few scattered hairs occur, interspersed between them, but these are not abraded as they would have been had the tail been used as a trowel. That this is the interpretation of the structure and purpose of the tail is I think self-evident from its fitness. The habit of flapping the tail on the ground before plunging into the water is probably only the mechanical repetition of the action with which it habitually starts into motion, and which in the water is essential to its progress.

The teeth of the beaver are often quoted as good examples of the mode in which rodent teeth grow from the pulp at their base, with a hard enamel-like steel on the outer edge, and

softer material on the inner side, and thus have their sharpness and chisel-like form always kept up by the very thing which at first sight would seem to be likely to make them blunt—viz., their constant use. The incisor teeth in the foetus are conical, thus showing that the chisel form in the adult is the result of abrasion. The specimens sent me are from the neighbourhood of Moose Factory.

I have adopted the specific name *Americanus* given to this species by the Russian naturalist Brandt, who has separated the American animal from the European and Asiatic (the true Castor fiber) on osteological grounds, chiefly drawn from the skull. For the reason alluded to above (want of specimens for comparison), I can give no opinion as to the propriety of this separation.

*Mus leucopus*, Rafin.—In his description of this species, Sir John Richardson says,—“The tail is thickly clothed with short hairs, lying pretty smoothly, no scales whatever being visible.” In my specimen it is not *thickly* clothed with hairs; it is rather sparingly clothed with hairs, and the scales are very apparent under them. He also says that “its” (the tail’s) “upper surface is of a hair-brown colour, considerably darker than any other part of the animal, and contrasts strongly with the inferior surface, which is white.” The upper surface of the tail in my individual is not nearly so dark as the back of the body; still, however, as it agrees in all other respects with *Mus leucopus*, I have no doubt that it is that species, and that these differences are only accidental variations in my specimen.

SHREW-MOLE? (*Scalops Canadensis*, Cuv.)—I have had no opportunity of comparing this animal with any named specimens, and my determination is made entirely from the description in Sir J. Richardson’s “Fauna Bor. Amer.” My specimen agrees, for the most part, with the description in that work; but there are one or two points on which I am not quite satisfied. In particular, the whole of the fore foot is said to have a close resemblance to that of the common mole. Now, although this has a general resemblance, it cannot be said to bear a close resemblance. It wants the sabre-shaped bone of the mole, and the nails are greatly smaller. The description



of the nails of the shrew-mole is, that they are large, white, and have a semi-lanceolate form, with narrow, but rather obtuse points. These in my specimen can scarcely (according to my ideas) be said to be large; but large is a word of very doubtful interpretation; what is large to one person may be very small to another; so that, on this item, I must mark my species with a query.

There is one point in the history of the shrew-mole which I should like to see either confirmed or expunged from our books—viz., that although a burrowing animal, it has the singular habit of coming daily to the surface exactly at noon.

*Sorex parvus*, Say.—This shrew may be readily distinguished from other American shrews by its tail being rounded instead of being more or less angular. One might be disposed to think that this is a character of little value, depending merely on the greater or less plumpness of the individual; but it does not appear to be so, and other characters concur with this to establish the species.

This one is certainly not well named; as, though undoubtedly a small animal, it is the largest of the North American species.

*Sorex Forsteri*, Rich.—The tail in this species is quadrangular. It is the smallest quadruped known to the Indians; and I cannot call to mind any quadruped with which I am acquainted, from any quarter of the world, which is smaller.

Among the specimens which have been sent me is one which differs slightly from the description of *S. Forsteri*. Its colour is wholly mouse-dun, whereas that of *Forsteri* is wholly clove-brown on the back. The specimen is in spirits, however; and the clove-brown being, from what we see in other specimens, a tinge of that colour in certain lights, it is probable that the darker colour is merely owing to the medium in which it has been sent; at all events, that the specimen is at most only a variety.

AMERICAN OTTER (*Lutra Canadensis*).—I have received a specimen from the York Factory district, in the shape of a medicine-bag, which is a favourite use of it with the natives.

PART III.—*Aves.*

Before commencing the enumeration of the birds, I should wish to make an ample preliminary acknowledgment of the assistance I have received in determining them, from our celebrated ornithologist Sir Wm. Jardine, Bart., and also from Dr J. A. Smith of Edinburgh. Their extensive knowledge and familiarity with the subject have saved me much labour; and wherever the species were difficult of determination, the reader has the satisfaction of knowing that it is introduced in accordance with the careful examination and deliberation of these gentlemen as well as myself.

*Archibuteo Sancti Johannis*, (Gmel.)

Received both from Severn House and Trout Lake Station.

Very near our own *Archibuteo lagopus*, or rough-footed falcon; indeed, the pale-coloured specimen scarcely differs from some European specimens of that bird.

*Falco peregrinus* (Gmel.), (Peregrine Falcon).

Trout Lake Station and Severn House, Hudson's Bay.

Sir J. Richardson says this bird is frequent in the barren grounds.

Sir W. Jardine tells me it is the *Falco anatum*, Bonap., of the American ornithologists. Well known at New Jersey from the havoc it makes among the water-fowl in winter. Mr Ord says, that the ducks when struck by it are lacerated from the neck to the rump.

*Falco candicans* (Gmel.), (American Gyr Falcon).

York Factory.

A constant resident in Hudson's Bay territories, known as the "speckled partridge hawk," and the "winterer."

*Circus cyaneus* (Linn.), (var. *Hudsonicus*), or it may stand *C. Hudsonicus*, (Linn.)

From Moose Factory and Severn House.

The male varies from the European specimens in the upper parts being darker, and in the lower breast and the belly being barred at wide intervals with pale sienna,—agreeing in this respect with the figure given by Bonaparte in his continuation of "Wilson's North American Ornithology." The young male differs in the darker general plumage and the deeper tint of the sienna on the under parts.

*Nyctea nivea* (Daud.), (Snowy Owl).

York Factory.

Two beautiful specimens received; one wholly white without a single dark spot.

*Surnia funerea* (Gmel.); (Hawk-Owl).

Trout Lake Station, Severn House.

*Asio brachyotus*, (Short-Eared Owl).

Trout Lake Station.

Slightly varies in shade of colour from some British specimens.

*Chordeiles Virginiana*, (Briss.)

Trout Lake Station.

*Ceryle alcyon* (Linn.), (Belted King-fisher).

York Factory.

The only king-fisher that inhabits the Fur countries in Hudson's Bay territory.

*Perisoreus Canadensis* (Linn.), (Canada Jay, or Whiskey Jack).

Severn House.

Very forward, and intrudes itself upon man, but pines away in confinement.

*Corvus Americanus*, (Audub.)

Trout Lake Station. Hudson's Bay.

The American representative of our *Corvus corone* or carrion crow.

*Agelaius phœniceus*, (Vieillot.)

Hudson's Bay.

This showy bird winters in vast numbers in the southern parts of the United States and Mexico. Its range to the north does not pass the 57th parallel.

*Agelaius xanthocephalus*, (Bonap.)

From Hudson's Bay.

*Turdus migratorius*, (Linn.), (American Robin).

Severn House, Trout Lake Station.

The colour is unusually bright in the specimens received.

*Sciurus Noveboracensis* (Bonap.), (*aquaticus*, Sw.)

Severn House.

*Anthus Ludovicianus*, (Gmel.)

Hudson's Bay.

*Sylvicola æstiva*, (Gmel.)

Hudson's Bay, Trout Lake Station, Severn House.

Known throughout the whole of the fur countries.

*Sylvicola striata* (Gmel.), (Blackpoll Warbler).

Hudson's Bay Trout Lake.

*Sylvicola parus*.

Severn House, Trout Lake.

*Otocorys cornutus* (Sw.), (Shore Lark).

York Factory, Severn House, &c.

Appears common.

*Plectrophanes nivalis* (Linn.), (Snow-Bunting).

Severn House, Trout Lake Station, Hudson's Bay.

Only goes to the south when the snow becomes deep.

*Plectrophanes Lapponica*, (Linn.)

Trout Lake Station and Severn House.

Like the last, is common to the northern regions of both Europe and America.

*Plectrophanes pictus*, (Sw.)

Severn House.

Seems scarcer than the others. Sir J. Richardson mentions that he had only obtained one specimen. Three have been sent to me.

*Zonotrichia leucophrys*, (Gmel.)

Severn House, Hudson's Bay.

*Zonotrichia albicollis*, (Gmel.)

Hudson's Bay.

This species winters in the southern parts of the United States.

Among the Cree Indians it bears the euphonious appellation of Oochaechimmenaw-kaw-mawkaw-seesh.

*Spizella monticola* (Gmel.), (*Emberiza canadensis*, Faun. B. Am.)

Severn House.

This bird winters in the United States.

*Linota borealis* = *canescens* (Gould).

Severn House.

The same bird known in this country as the Mealy Redpoll.

*Loxia leucoptera*, (Gmel.)

Hudson's Bay, Severn House, and Trout Lake Station.

*Corythus enucleator* (Linn.), (Pine Grosbeak).

Severn House.

*Scolecophagus ferrugineus*, (Gmel.)

Severn House, Trout Lake.

The most northern species,—called Rusty Grackle by Americans.

The male is not rusty, but the female has a ferruginous tinge.

*Lanius septentrionalis*, Gmel. = *borealis* of Vieillot "Orn. Amer.

Sept.;" but he unfortunately gave the same name to a European bird in his "Faun. Franc.;" Gmelin's name, therefore, should stand. It is very difficult to make out the birds of this genus; and there almost seems reason to look upon the American species as varieties of the European, but ornithologists have accepted them as different.

Trout Lake Station and Severn House.

*Tyrannus borealis* (Sw.), (*T. Cooperi*, Bonap.)

Hudson's Bay.

(One specimen.) A rare bird, and to be seen in very few collections.

*Colaptes auratus*, (Linn.)

Trout Lake and Hudson's Bay.

One of the woodpeckers; but as it feeds on ants, and therefore does not require so much labour to get its food as the other woodpeckers, its bill is less suited for such work. It is only a summer visitant to the fur countries.

*Apternus tridactylus*, (Sw.)

Severn House.

(One specimen.) The common three-toed woodpecker.

*Lagopus albus* (Gmel.) = *L. subalpinus* (Nils.), and *L. saliceti* (Less.), of Europe; and also = *L. Scoticus* of Britain. (*Fide* Jardine.)

In consequence of Sir William Jardine's desire to procure specimens of this species in the various states of plumage, to assist in elucidating the question which he has started, whether it is not the same as the common grouse of this country, I begged my correspondents to furnish me with a good series of specimens in their plumage at different seasons of the year, and a fine series of lovely skins, beautifully preserved, has accordingly been sent, which have proved of much use to Sir William in his inquiry. The above synonymy shows the result to which he has come.

I also particularly drew the attention of my friends to the white-tailed grouse in relation to its affinity to this species, but no specimens of it have as yet been received. Mr A. McDonald, stationed at Little Whale River, however, writes me as follows on the subject:—"I am not aware that the white-tailed grouse is to be found in this locality. We have two sorts of the ptarmigan—the large one, which is generally found among the willows, is, I believe, the willow grouse. The other is much smaller, and confines itself almost entirely to the rocks.\* This latter may be the white-tailed grouse to which you refer. I have never seen it in summer, and indeed they do not, I believe, make their appearance till after a considerable quantity of snow has fallen. They are of about the size of the common pigeon." He adds, "I will be able to procure good specimens of both these, and, if possible, in the various stages." As specimens of this white-tailed grouse are exceedingly scarce in museums in Britain, such a supply will be acceptable.

*Tetrao Canadensis*, (Linn.)

Trout Lake and Hudson's Bay.

*Tetrao phasianellus*, (Linn.)

Trout Lake Station.

The *Tetrao obscurus* (Rich. and Sw.), or Dusky Grouse of the Northern Zoology, has not yet been received.†

\* This smaller bird, if not the white-tailed species, will be *L. mutus* (Leach), or common ptarmigan of Great Britain. The white-tailed bird cannot be mistaken, none of the tail feathers being black, as in the other two species.

† *Tetrao obscurus* (Say), and the *Tetrao obscurus* (Richard and Swain), Faun. B. Am., are quite distinct, and specimens of the latter from northern latitudes are much wanted.

*Porzana Carolina* (Linn.), (Carolina Rail).

Severn House.

*Pluvialis Virginicus*, (Borkh.)

Trout Lake Station and Severn House.

The American representative of our golden plover, specifically distinguished from it by its lesser size, and the axillary feathers being dusky, instead of white. Like our own golden plover, this bird is highly prized as food.

*Charadrius semipalmatus*, (Kaup.)

Trout Lake Station and Severn House.

Plentiful in Arctic America.

*Squatarola helvetica*, (Linn.)

Severn House.

This may be looked upon as only a northern state of our grey plover. My specimens are in full *breeding plumage*, and the ground colour of all the upper parts nearly white; certainly appears to be influenced by climate.

*Streptilas interpres*, (Linn.)

Hudson's Bay and Severn House.

A citizen of the world.

*Grus Canadensis*, (Temm.)

Trout Lake Station.

*Botaurus lentiginosus* (Montag.), (American Bittern).

Severn House.

*Numenius Hudsonicus*, (Lath.)

Severn House.

*Tringa alpina*, (Linn.)

Severn House.

*Totanus melanoleucus* (Gmel.), (*vociferus*, Sab.)

Severn House.

The specimens received agree with Gmelin's description of the breeding plumage, but differ somewhat from those usually seen, which generally come farther from the south.

*Totanus flavipes*, (Vieill.)

Severn House.

*Limosa fedoa*, (Linn.)

Hudson's Bay.

*Limosa Hudsonica*, (Lath.)

Severn House.

*Phalaropus lobatus*, (Ord.)

Severn House.

*Anser hyperboreus* (Gmel.), (Wavë; Snowy Goose).

Moose Factory and Severn House.

*Bernicla Canadensis* (Linn.), (Cravat Goose; Canada Goose).

There are most probably more than one species confounded under the old name of *Anas Canadensis* of Linnæus, founded on the figures of Brisson, Catesby and Edwards, which all evidently

refer to one species. Sir John Richardson mentions two Indian synonyms for it—viz., *Neescah* and *Mistchay-neescah*, besides that of *Apisteeskeesh* for Hutchin's goose, from whence we may, I think, legitimately infer that the Indians recognise two species at least, this being peculiarly a case where dependence may be placed on the observations of natives, the animals being one of the objects of their chase, and a knowledge of the habits and distinctions of different species being essential to their success in hunting them. Three skins have been received, which appear to belong to three different species; the one of middle size being without doubt the true Canada goose. The smallest one differs in the form of the bill, which is more Bernicle-like; it resembles *B. Hutchinsii*; and Sir William Jardine informs me it agrees very exactly in size, &c., with a bird from Mexico, described by Cassin, from the Philadelphia Museum, under the name of *parvipes*. And he adds,—“Its being from Mexico is no drawback, the Philadelphia Museum possesses only one specimen, and that would be migratory.” The largest specimen seems also distinct, and does not appear to have been described; and as it is obvious that, whether it be really a new species or merely in a different state of plumage, it must, when it becomes known, be sooner or later described and made identifiable as a variety, if not as a species, I think I can do no harm in describing it, and giving it a provisional cognomen.

*Bernicla leucolæma*, (Murray). (Plate I.)

Beak black; head and greatest part of the neck black; chin and throat white, the white extending upwards and backwards beyond the ear coverts, and also extending downwards along the under side of the neck almost to the end of the black portion, but tapering away and becoming narrower and somewhat interspersed with black feathers as it extends downwards; the under eyelid broadly white; the white on the cheeks, &c., without black flecks; the black on the fore part of the head and behind the white space flecked with white; the back and the wing coverts, the secondaries and tertiaries light brown, with lighter coloured edges to the feathers; primaries dark brown; tail feathers black; the rump black; upper tail coverts white; lower part of the neck pale dirty lavender; upper part of breast still paler; lower part and belly almost white, except a broad pale lavender-coloured band across the middle, just before the tops of the thighs, or, perhaps, I

should rather express it as breast and belly pale lavender-coloured, with a broad white band across the breast; vent and under tail coverts white; legs and first phalanges pale brown, probably paler when in life; remainder of the phalanges and interdigital membranes bright yellow, sparingly spotted here and there with black or brown. Length, 40 inches.

Its general appearance is very much the same as that of the Canada goose. The following are the particulars in which it differs:—

In colour.—In the Canada goose the white cravat does not extend downwards along the under side of the neck, but is quite abruptly defined, and cut off; in *B. leucolæma* it does, so as to give the appearance not only of a white cravat under its chin, but also a white frill or shirt appearing in front down its black waistcoat. In the Canada goose the white cravat is flecked more or less with blackish specks; in *leucolæma* it is wholly white. In the Canada goose, the black head in front of, and above the white cravat, is wholly black; in *leucolæma* it is flecked with an occasional white speck, and most so where it joins the upper mandible both in front and on each side. In the Canada goose the space between the *rami* of the lower mandible is black or blackish; in *leucolæma* it is pure white. The white on the lower eyelid is comparatively broad and distinct in *leucolæma*; in the Canada goose it is a mere line like a thread.

The general tone of the plumage of the body, both above and below, is considerably paler in *leucolæma* than in the Canada goose—the black primaries having become brown, the brown back having become somewhat fawn-coloured, and the fawn-coloured under side having become dirty white, with a pale bluish or lavender-coloured broad band stretching across the belly between the two thighs.

The black on the neck extends rather a shorter distance down in *leucolæma* than in the Canada goose.

The legs are yellowish-brown, and the interdigital spaces bright yellow in *leucolæma*, instead of being black as in the Canada goose. I believe that in some species of geese the colour of the leg changes according to the age; but this would not appear to be the case in the Canada goose, because Captain Ord informs me that the colour is constantly black,



both in old birds and young broods, which he has reared since 1852.

There are also some differences in the relative proportions, which I shall tabulate for the sake of brevity and easier reference, and shall include in the comparison the proportions of the following species supposed to be *B. Hutchinsii*. The measurements are taken from the specimens which I have received from Hudson's Bay, one of each bird, and all these apparently full grown:—

	<i>B. Cana-</i> <i>densis.</i>	<i>B. leu-</i> <i>colæma.</i>	<i>B. Hut-</i> <i>chinsii?</i>
	Inches.	Inches.	Inches.
Length of bird, from tip of bill to end of tail feathers, measured along the back,	39½	40	32
Length of upper mandible, from tip to where the downy plumage begins, measured along the middle,	2	2½	1¾
Breadth of upper mandible across the nostrils,	1¼	1½	1¼
Height of upper mandible at the nostrils,	½	½	½
Length of head, from base of the middle of the mandibles to the occiput,	3¼	3½	2½
Length of wing, from carpal joint to end of longest wing feathers,	19¾	19¼	15½
Length of tarsus,	3½	3	3
Length of first phalanx of middle toe,	1¼	1½	1¼

There is also a slight difference in the arrangement of the scuta on the phalanges of the Canada goose and *leucolæma*, though not very decided. In the next species this is much more marked.

*B. Hutchinsii?* Richard and Swain. (Plate I).—The preceding measurements show that this is a much smaller bird, and it will be observed that the proportions are different. The bill is proportionally much smaller, narrower, and deeper, than in the other two. The colour is much the same as in the Canada goose, but darker and richer on the back, and with a greater shade of fawn on the belly, instead of the lavender colour in the Canada goose, owing to the colour of the terminations of the abdominal feathers. The cravat-patch wants the black flecking which Captain Ord informs me he has found to be a constant character in his specimens of the Canada goose.

There is a marked difference in the mode of arrangement of the scuta on the first phalanx of the middle toe. In the two preceding species there are three oblique transverse scuta at the distal extremity, those further back being broken up into polygonal plates; while in this species there are seven broad transverse plates so placed instead of three; the remainder are also transverse, though narrower. ~~The difference in the arrangement in the different species is shown in the plates.~~ I by no means say with any degree of confidence that my specimen is *B. Hutchinsii*. I have had no opportunity of examining an authentic specimen of that species, the specimens placed by Sir John Richardson in the museum of the Edinburgh University being no longer to be found there; but it answers better to it than any other description, and therefore, although not wholly corresponding to it, I place it under this name, but with a query.

I may add, that before coming to the conclusion that these two species were distinct from the Canada goose, care has been taken to consult every accessible authority. The specimens have been shown to Sir John Richardson, who concurs in the opinion that they are distinct.

The want of some information as to the habits of the birds sent by my correspondents, deprives us of one important aid in determining the species. For instance, Hutchin's goose differs from the true Canada goose in frequenting the sea-coast, feeding on mollusca, and having a fishy taste, instead of feeding on herbage in the fresh-water lakes, which is the habit of the Canada goose proper. This specimen was taken at Severn House.

*Anas boschas* (Linn.), (Common Mallard).

Trout Lake Station and Severn House.

*Dafila acuta* (Linn.), (Pintail).

Trout Lake Station and Severn House.

*Rhynchaspis clypeata* (Linn.), (The Shoveller).

Moose Factory and Trout Lake.

*Mareca Americana*, (Steph.)

Hudson's Bay.

*Somateria V. nigrum*, (Gray).—Proc. Zool. Soc. 1858.

Severn House.

This specimen was sent to me by Mr Bernard R. Ross of the Mackenzie River district, as the common Eider Duck,

which he thought might be of interest from having been shot on Great Slave Lake,—the Eider being supposed exclusively a sea duck,—but its occurrence in this fresh-water lake may have been accidental, or it may have been there for breeding purposes, many sea ducks having recourse to fresh-water lakes for this purpose. A circumstance of greater interest, however, is, that it is not the common eider, but the Kamtschatkan species *Somateria V. nigrum*, distinguished by a black mark in the shape of the letter V under the chin, and it is the first time that this species has been recorded as being taken east of the Rocky Mountains. Its occurrence in Great Slave Lake certainly does not necessarily imply that it is to be found in Hudson's Bay and the east coast, but it may be so, and I would direct the attention of my friends there to it. It is so easily identified by the black V under the chin that if it occurs there I think we may now be certain of ascertaining the fact.

*Harelda glacialis*, (Linn.)

Severn House.

*Fuligula affinis* (Eyt., Yarr.), (Amer. Scaup Duck).

Severn House.

*Clangula albeola* (Linn.), (Buffel-headed Garrot).

Severn House, Moose Factory, Trout Lake Station.

*Querquedula Americana*, (Linn.)

Hudson's Bay.

This is the American representative of our common teal. Sir J. Richardson remarks that the only difference he could find between the common teal and its American representative was, that the English bird has a white longitudinal band on the scapulars which the other wants. The American bird has usually a transverse broad white bar not possessed by the English. He makes the two species only varieties, but other authors have followed Pennant, and rightly (as it appears to me) kept them distinct. The female specimen sent me, however, wants the transverse white bar, and Sir John refers to a specimen (he does not say whether male or female) in the Hudson's Bay Company's Museum which wants it.

*Dendronessa sponza* (Linn.), (Summer Duck).

Hudson's Bay, Moose Factory, Trout Lake Station.

*Oidemia perspicillata* (Flem.), (Surf Scoter).

Hudson's Bay.

*Oidemia velvetina* (Cassin), (*Deglandii*, Bonap.).

Trout Lake Station, Moose Factory, Severn House.

Until put right by Sir Wm. Jardine, I confounded the single specimen received of this species with the *Oidemia fusca*, or velvet scoter of Britain and Europe, to which it is very closely allied—the specific differences consisting in the proportions of the bill, the form of the tuberosity on it, and in the white spot under the eye being larger, and extending in a narrow circle partially round the eyelids. Sir William suggests that both the American and European bird may range in each continent, and that we may find the American form here, or if not, that it is just one of those very close forms which requires farther examination to enable us to say whether it is an extent of variation only, or really a distinct species.

*Oidemia Americana* (Linn.), Trout Lake.

*Mergus serrator* (Linn.); Trout Lake, Severn House.

*Mergus cucullatus* (Linn.); Hudson's Bay, Trout Lake.

*Pelecanus erythrorhynchus* (Gmel.); Hudson's Bay.

*Larus zonorhynchus* (Rich. and Sw.) (?); Hudson's Bay.

Sir Wm. Jardine remarks that in any specimens or figures of the *L. zonorhynchus* which he has seen, the black-mark on the bill is at some distance from the tip, which is not the case in this specimen. It does not agree with any other, therefore, most probably, is a variety of this species.

*Larus argentatus* (Gmel.); Severn House.

*Lestris cephus*, Brunnich 1764 (*Buffonii*, Yarr.); Moose Factory.

*Xema Bonapartii* (Rich. and Sw.); Severn House.

Fortunately several specimens of this gull have been received. It is rare in collections, but would appear not to be so in Hudson's Bay.

*Sterna Hirundo* (Linn.), (Common Tern.); Hudson's Bay.

*Sterna arctica* (Temm.); Moose Factory and Trout Lake.

*Sterna nigra* (Linn.); Moose Factory, and Severn House.

*Uria grylle* (Lath.), (Black Guillemot.); Severn House.

*Podiceps cornutus* (Linn.) (Horned Grebe); Trout Lake.

The band on the head and cheeks is much paler in the specimen received than in European specimens.

*Colymbus arcticus* (Linn.), (Black-throated Diver); Severn House.

*Colymbus glacialis* (Linn.), (Great Northern Diver); Severn House.



Fig. 1

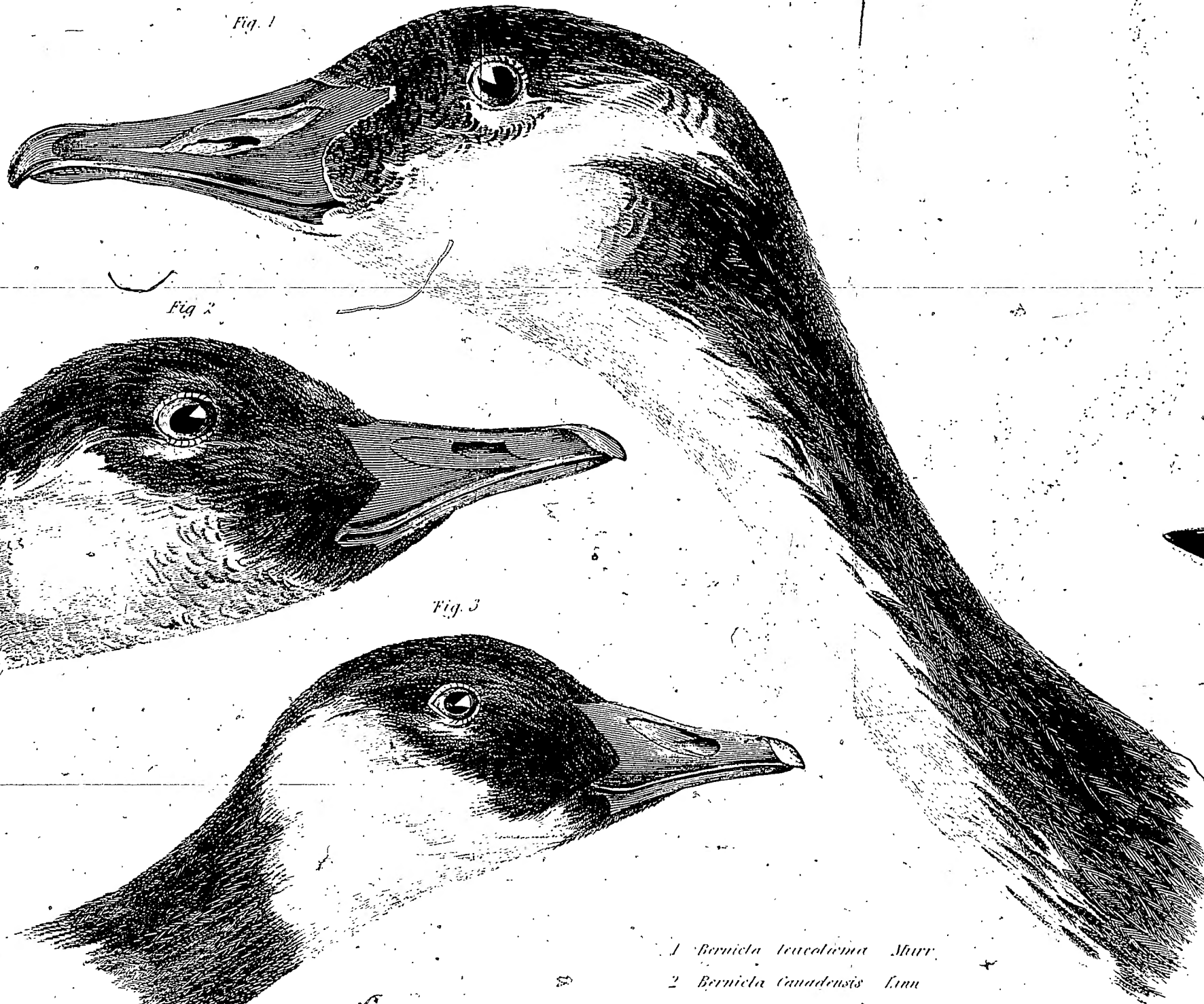


Fig. 2

Fig. 3

1 *Bernicla leucoloma* Murr.

2 *Bernicla canadensis* Linn.

3 *Bernicla hutchinsii*? Rich.